

In re ELLIOT, et al.
09/614,586
Reply to Office Action of Apr. 28, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A heating/air-conditioning installation for a motor vehicle, ~~said installation~~ comprising a thermal loop which includes a refrigerating compressor, a condenser, a pressure-reducing valve, an evaporator[[,]] and a heating element, wherein the condenser and the heating element are interconnected together into ~~[[a single exchanger including a main module forming]]~~ a main fluid-carrying heat exchanger ~~adapted~~ provided to simultaneously carry both a heat-carrying fluid and a refrigerant fluid, ~~and wherein the main fluid-carrying heat exchanger includes at least one first circulation element carrying the heat-carrying fluid and at least one second circulation element carrying the refrigerant fluid so that the first circulation element at least partially circumscribes the second circulation element in contact therewith.~~

Claim 2 (currently amended): The installation of Claim 1, wherein the main fluid-carrying heat exchanger ~~further~~ comprises:

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[[-]] at least one surface for exchanging heat between air and the heat-carrying fluid flowing through the main fluid-carrying heat exchanger, and

[[-]] at least one surface for exchanging heat between the heat-carrying fluid and the refrigerant fluid flowing through the main heat-carrying fluid exchanger.

Claim 3 (withdrawn): The installation of Claim 2, wherein the said main exchanger consists of a stack of modules each of which includes:

- an element for exchanging between the heat-carrying fluid and the refrigerant fluid, having at least one surface in thermal contact with an element for exchanging with the air; and
- the said element for exchanging with the air.

Claim 4 (withdrawn): The installation of Claim 3, wherein the said element for exchanging between the heat-carrying fluid and the refrigerant fluid successively exhibits:

- a first heat-carrying fluid circulation element;
- a refrigerant-fluid circulation element having a first surface in thermal contact with a first surface of the first heat-carrying fluid circulation element, and a second surface in contact with a first surface of a second heat-carrying fluid circulation element;
- the said second water circulation element, and in that the said element for exchanging

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with the air exhibits a first surface for exchanging with a second surface of the second heat-carrying fluid circulation element and a second surface for exchanging with a second surface of the first heat-carrying fluid circulation element of an adjacent module.

Claim 5 (withdrawn): The installation of Claim 3, wherein the said modules also exhibit at least one surface for exchanging between the air and the refrigerant liquid flowing through the main exchanger.

Claim 6 (withdrawn): The installation of Claim 5, wherein the said element for exchanging between the heat-carrying fluid and the refrigerant liquid successively exhibits:

- a third heat-carrying fluid circulation element having a first surface in thermal contact with a second refrigerant-fluid circulation element
- the said second refrigerant-fluid circulation element.

Claim 7 (currently amended): The installation of Claim 1, wherein the main fluid-carrying heat exchanger further comprises:

- [[-]] at least one surface for exchanging heat between air and the refrigerant fluid, and
- [[-]] at least one surface for exchanging heat between the heat-carrying fluid and the refrigerant fluid.

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Claim 8 (currently amended): The installation of claim 1, wherein the main fluid-carrying heat exchanger includes a ~~single~~ first collector of the heat-carrying fluid and a ~~single~~ second collector of the refrigerant fluid, said first and second ~~single~~ collectors being arranged at opposite ends of the main fluid-carrying heat exchanger.

Claim 9 (currently amended): The installation of Claim 8, wherein ~~an exchanger element~~ the main fluid-carrying heat exchanger within the thermal loop exchanges heat between the heat-carrying fluid and the refrigerant fluid, ~~said element comprises wherein the~~ at least one heat-carrying fluid circuit ~~first circulation element of the main fluid-carrying heat exchanger is~~ provided for circulating the heat-carrying fluid along an outwards and return path from and to the first collector and ~~the at least one refrigerant-fluid circuit second circulation element is provided~~ for circulating the refrigerant fluid along an outwards and return path from and to the second collector.

Claim 10 (currently amended): The installation of Claim 9, wherein circulation of the refrigerant fluid and circulation of the heat-carrying fluid currents ~~[[are]] take place at least partly~~ along U-shaped paths opposite to each other and arranged so that the refrigerant fluid and the heat-carrying fluid circulate counter to each other.

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Claim 11 (withdrawn): The installation of Claim 8, wherein the refrigerant-liquid collector exhibits an element of volume forming a refrigerant-liquid bottle for the thermal loop.

Claim 12 (withdrawn): The installation of Claim 11, wherein the said bottle is made of extruded metal.

Claim 13 (withdrawn): The installation of Claim 12, wherein the refrigerant-fluid collector and the bottle are co-extruded.

Claim 14 (withdrawn): The installation of claim 1, wherein the said exchanger includes an auxiliary module forming an auxiliary heat-carrying fluid/refrigerant fluid exchanger which is traversed by the refrigerant fluid and by a heat-carrying cooling fluid, and which is intended to serve as a sub-cooling exchanger for the refrigerant fluid and/or as evaporator for a heat pump.

Claim 15 (withdrawn): The installation of Claim 14, wherein the said auxiliary module includes a stack of heat-carrying fluid/refrigerant fluid exchange modules.

Claim 16 (withdrawn): The installation of Claim 14, wherein the thermal loop exhibits a first routing circuit in order, in heating mode, to form a heat pump the condenser of which is the

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said main exchanger and the evaporator of which is the said auxiliary exchanger.

Claim 17 (currently amended): The installation of Claim 1, wherein the thermal loop further comprises an additional evaporator for operation in a heating mode and a ~~second~~ routing circuit defining a heat pump in the heating mode, the heat pump utilizing the condenser of the main fluid-carrying heat exchanger and the additional evaporator as an apparatus for converting the ~~refrigerant fluid liquid~~ into vapor.

Claim 18 (currently amended): The installation of Claim 1, wherein the thermal loop further comprises a ~~second~~ routing circuit forming a heating loop in a thermal heating mode, the heating loop including the compressor and the main fluid-carrying heat exchanger, a refrigerant-fluid outlet of the main fluid-carrying heat exchanger being coupled to an inlet of the compressor.

Claim 19 (previously presented): The installation of Claim 18, further comprising a second pressure-reducing valve arranged downstream of the main fluid-carrying heat exchanger.

Claim 20 (currently amended): The installation of Claim 1, wherein ~~the heat-carrying fluid is in the form of one of a cooling water and an overcooled water and wherein~~ the thermal loop includes a supply device for supplying the main fluid-carrying heat exchanger with ~~the at~~

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least one of cooling water and overcooled water as the heat-carrying fluid.

Claim 21 (currently amended): The installation of Claim 20, further comprising:

[[-]] an air-conditioning mode in which the main ~~fluid-carrying heat~~ exchanger is traversed by the refrigerant fluid and by ~~said the overcooled water heat-carrying fluid~~, and

[[-]] a heating mode in which the main fluid-carrying heat exchanger is traversed by ~~said the heat-carrying fluid cooling water~~.

Claim 22 (previously presented): The installation of Claim 21, further comprising a mixing flap which, in the air-conditioning mode, is in a closed position in which airflow is restricted to the main fluid-carrying heat exchanger.

Claim 23 (previously presented): The installation of Claim 22, further comprising a de-misting mode in which the air-conditioning mode is activated, and in which the mixing flap is in an at least partially open position, so that the main exchanger is traversed by at least a part of the airflow.

Claims 24-29 (canceled)

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Claim 30 (currently amended): The installation of Claim 1, wherein the ~~heat-carrying fluid flows through a first circulation element and the refrigerant fluid flows through a second~~ circulation element is disposed adjacent to and abutting ~~said the~~ first circulation element.

Claim 31 (currently amended): The installation of Claim 30, further comprising a heat dissipating fin adjacent ~~said the second~~ first circulation element.